

## **SECTION 01410 - TESTING LABORATORY SERVICES**

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### **1.6 CONTRACTORS RESPONSIBILITIES**

- A. Cooperate with Laboratory personnel, provide access to **Work** and to manufacturer's operations.
- B. Secure and deliver to the Laboratory adequate quantities of representative samples of materials proposed to be used and which require testing.
- C. Furnish the Laboratory with proposed concrete design mixes, and other material mixes which require evaluation by the Testing Laboratory, a minimum of fourteen (14) days prior to **use** on the Project.
- D. Furnish incidental labor and facilities:
  - 1). To provide access to **Work** to be tested.
  - 2). To obtain and handle samples at the project site or at the source of the product to be tested.
  - 3). To facilitate inspections and tests.
  - 4). For safe storage and curing of test samples.
- E. Notify Laboratory and Project Management Firm sufficiently in advance of operations to allow for Laboratory assignment of personnel and scheduling **of** tests.
  - 1). When tests or inspection cannot be performed **after** such notice, reimburse Laboratory for **personnel** and travel expenses incurred due to Contractor's negligence.
  - 2). Make arrangements with Laboratory and pay for additional samples **and** tests required for Contractor's convenience.
  - 3). Make arrangements with Laboratory and pay for additional samples and tests required when initial tests indicate **non-compliance** with Contract Documents, including load test.
  - 4). Pay the Testing Laboratory for such tests **or** inspections **as** are performed exclusively for the Contractor's convenience.

### **PART 2 - PRODUCTS (Not Applicable)**

### **PART 3 - EXECUTION**

#### **3.1 CONCRETE CONTROL AND TESTING**

- A. Concrete composite samples in accordance with ASTM C 172. Each sample shall be obtained from a different batch of concrete on a random basis, avoiding any selection of the test batch other than by a number of selected at random before commencement of concrete placement.

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- B. All concrete with required strength of 3000 psi or less shall be tested as follows:
  - 1). Mold and cure five (5) specimens from each sample in accordance with ASTM C31.
  - 2). Two (2) specimens shall be tested at seven (7) days for information, two (2) shall be tested at twenty-eight (28) days for acceptance, and the remaining cylinder shall be tested as directed.
- C. Specimens for pumped concrete shall be taken at the discharge end of pumping equipment.
- D. Any deviations from the requirements of ASTM Specifications shall be recorded in the test report. Test concrete specimens in accordance with ASTM C39.
- E. Make at least one (1) strength test (five specimens) for each 100 cubic yards of fraction thereof, of each mix design of concrete placed in any one day. Determine slump of the concrete sample for each strength test and whenever consistency of concrete appears to vary, in accordance with ASTM C143.
- F. Determine air content of air-entrained, normal weight and/or lightweight concrete sample for each strength test, in accordance with either ASTM C231, ASTM C173, or ASTM C138. Determine temperature of concrete sample for each strength test.
- G. Inspect each batch of concrete, monitor addition of mixing water to assure uniform consistency from truck to truck. Check mixing from mixers before mix begins to set and from mixers before mix begins to set and within time limits set forth in ASTM C94.
  - 1). Monitor addition of water to concrete at job site and length of time concrete is allowed to remain in truck during placement.
  - 2). Certify each delivery ticket indicating class of concrete delivered, amount of added water and time at which cement and aggregate was discharged into truck, and time at which concrete was discharged from truck.
- H. Should strength of concrete fall below the minimum, then additional tests, including load tests, may be required. These tests, if required, shall be made at the Contractor's expense and shall be in accordance with ASTM C42 and ACI 318. If tests do not meet the applicable requirements, then the structure, or any part of the structure, shall be removed and replaced at the Contractor's expense.
- I. Test reports shall show concrete mix identification number or give proportions of ingredients, time test was made, truck ticket, number, slump and time of batching, and location of each placement.
- J. Report promptly to Project Management Firm all details of reasons for rejection of any and all quantities of concrete. Give all information concerning locations of the concrete pours, quantities, date of pours, and other pertinent facts concerning concrete represented by the specimens.

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- K. Any concrete testing requested by the Contractor for early formwork or shoring removal, etc., shall be at the Contractor's expense.

### **3.2 TESTING MASONRY MORTAR AND GROUTS**

- A. Check mix designs for mortar and grouts. Make tests of mortar and grout to approval for use at project site. Perform four (4) tests in accordance with ASTM C39 for each twenty-five (25) cubic yards of mortar.

**END OF SECTION 01410**

## **SECTION 01411 - HVAC TESTING, ADJUSTING AND BALANCING**

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### **PART 1 - GENERAL**

#### **1.1 REQUIREMENTS INCLUDED**

- A.** Contractor shall employ and pay for the services of an Independent Testing Agency for testing and balancing HVAC systems.
  - 1.** The testing, adjusting and balancing (TAB) of HVAC systems will be performed by an impartial Independent Testing Agency whose operations are limited only to the field of professional TAB. TAB work shall be done under direct supervision of a professional engineer employed by the TAB firm.
  - 2.** The Contractor shall cooperate with TAB firm; provide necessary data on design and proper application of system components; furnish labor and materials required to eliminate any deficiencies or malperformance.
  - 3.** The Contractor shall be responsible to Authority for satisfactory execution of TAB work. Allow sufficient funds in Project bid proposal and sufficient time in Project schedule to cover all work required for completion of TAB work.

#### **1.2 RELATED WORK**

- A.** Drawings and General Provisions of the Contract, including but not limited to, General and Supplementary Conditions and Division 1 Section, apply to Work of this Section.
- B.** Refer to Division **15** and Division **16** for testing in conjunction with other MEP work.

#### **1.3 QUALIFICATION OF HVAC TESTING, ADJUSTING AND BALANCING FIRM**

- A.** Minimum Qualification of HVAC Testing, Adjusting and Balancing Firm:
  - 1.** Qualifications of Firm:
    - a.** Firm shall be one which is licensed to do professional services of this specified type and as a minimum have one professional engineer with current registration to perform such professional services.
    - b.** Firm shall be capable of performing services at location of facility described within time specified, preparing and submitting the detailed report of actual field work as may be required.
  - 2.** Qualifications of TAB Firm Personnel:
    - a.** A minimum of one professional engineer with current registration is required to be in the permanent employment of firm for supervision and direction in the work performed. This engineer shall be totally responsible for developing job site data and required for test procedures.

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- b. All personnel used on job site shall be either professional engineer or technicians, who shall have been permanent, full time employees of **firm** for a minimum of six months prior to start of work for that ~~specified~~ project.

### **1.4 LABORATORY DUTIES AND RESPONSIBILITIES**

#### **A. HVAC Testing and Balancing:**

1. TAB **firm** shall inspect installation of mechanical piping systems, sheet metal work, temperature controls and ~~other~~ component parts of heating, air conditioning and ventilating systems. Inspection of work shall cover that part relating to proper arrangement and adequate provisions for testing and balancing.
2. **TAB firm** shall review Drawings and Specifications to identify any potential balancing problems and to determine if there are adequate provisions for testing and balancing systems. Contractor shall report any problem to the PMF.
3. Upon completion of installation and start-up on mechanical equipment, check, adjust and balance system components to obtain optimum conditions in each conditioned space in building. Prepare and submit to Authority, ~~or~~ Authority's delegated representative, complete reports on the balance and operation of systems.
4. Measurements and recorded readings of air, water and electricity that appear in reports must be done by permanent employed technicians or engineers of **firm**.
5. Make a total of three (3) inspections within ninety (90) days after occupancy of building to insure that satisfactory conditions are being maintained throughout and to satisfy any unusual conditions.
6. Make an inspection in building during opposite season in which initial adjustments were made, and at that time make any necessary modifications to initial adjustment required to produce optimum operation of system components to produce proper conditions in each conditioned space. At time of opposite season checkout, Authority's representative shall be timely notified before any readings or adjustments.

### **1.5 CONTRACTOR'S RESPONSIBILITIES**

#### **A. HVAC Testing, Adjusting and Balancing**

1. Have all systems complete in operational readiness prior to notifying TAB **firm** that Project is ready for their services, and so certify in writing to Authority that such ~~a~~ condition exists.
2. **Make** any changes in sheaves, belts and dampers or the addition of dampers required for correct balance as required by **TAB firm**, at no additional cost to Authority.

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3. Provide and coordinate services of qualified, responsible subcontractors, suppliers and personnel as required to correct, repair or replace any and all deficient items or conditions found during that testing, adjusting and balancing period.
4. In order that systems may be properly tested, balanced and adjusted as required by these specifications, operate said system for length of time necessary to properly verify their completion and readiness for **TAB** and pay costs of operations during **TAB** period.
5. Provide time frame allowance in Contract completion schedule to permit completion of **TAB** services prior to Authority occupancy.
6. Complete operational readiness, prior to commencement to **TAB**, services shall include the following:
  - a. Construction status of building shall permit closing of doors, windows and ceilings installed to obtain projected operational conditions.
7. Air Distribution Systems:
  - a. Verify installation for conformity to design. Supply, return and exhaust ducts terminated and pressure tested for leakage as required by Specifications.
  - b. Volume and fire dampers properly located and functional. Dampers serving requirements of minimum and maximum outside air, return and relief shall provide tight closure and full opening smooth and ~~free~~ operation.
  - c. Supply, return, exhaust and transfer ~~grilles~~, registers, diffusers and terminal units installed.
  - d. Air handling systems, units and associated apparatus, such ~~as~~ filter sections and access doors, shall be blanked or sealed to eliminate excessive bypass or air leakage.
  - e. Fans (supply, return, and exhaust) operating and verified for freedom from vibration, proper fan rotation and belt tension; heater elements shall be proper size and rating; record motor amperage and voltage and verify name plate ratings are not exceeded.
- E. Water Circulating Systems:
  - a. Check and verify pump alignment and rotation.

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- b. Position and valves pertinent to system design and require operation to permit full flow of water through system components. Operate hydronic systems under full flow conditions until circulating water is clean. Strainers shall be removed and cleaned as required during this cycle of operation.
  - c. Record each pump motor amperage and voltage. readings shall not exceed name plate rating.
  - d. Verify electrical heater elements to be of proper size and rating.
  - e. Water circulating systems shall be full of water and free of air, expansion tanks set for proper water level and air vents installed at high points of systems and operating **freely**.
  - f. Check and set operating temperature of heat exchangers **to** design requirements.
9. Automatic Controls:
- a. Verify that control components are installed in accordance with Project requirements and functional, including electrical interlocks, damper sequences, firestats and smoke detectors.
  - b. Controlling instruments shall be functional and set for designed operating conditions. Factory **precalibrabration** of thermostats will not be acceptable.
  - c. Temperature regulation will be adjusted for proper relationship between controlling instruments and calibrated by control subcontractor using data submitted by TAB firm. The correctness of final setting shall be proved by taking hourly readings for a period of three (3) successive 8-hour days in a typical room on each separately controlled **zone**. Total variation shall not exceed 2 degrees **from** present median temperature during entire temperature survey period.
10. TAB **firm** will not instruct or direct Contractor in any of the work, but will make such reports as are necessary direct to Project Management Firm. Plans and miscellaneous adjustment devices for purpose of adjustment to obtain optimum operation conditions; install these devices in a **manner** that will leave them readily accessible, provide access **as** required by TAB firm.
11. Provide Plans, Specifications, and Change Orders to TAB **firm**.
12. Provide approved submittal data on equipment installed and related changes required to accomplish test procedures outlined in this Section of Specification.

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13. Transmit one (1) copy of the following information to TAB firm for review and comments:
  - a. "As Installed drawings.
  - b. Approved Fixture Brochure.
  - c. Approved Wiring Diagrams.
  - d. Approved Control Diagrams.
  - e. Shop drawings.
  - f. Instructions.
  - g. Valve Charts.

### **1.6 HVAC TESTING, ADJUSTING AND BALANCING**

#### **A. Testing and Balancing Air Systems:**

1. Test and adjust air systems to conditions set forth in Plans and Specifications. Air systems include:
  - a. Supply Air Systems.
  - b. Return Air Systems.
  - c. Exhaust Air Systems.
2. In fan systems, air quantities indicated on Plans may be varied as required to secure a maximum temperature variation of 2 degrees within each controlled space, but total air quantity indicated for each zone must be obtained.
3. Test and adjust blowers and fan to deliver CFM required by the systems with concurrent recording of RPM, supply voltage and full load amperes. Report any changes of belts and sheaves required.
4. Mark pitot tube traverses of main supply, return and exhaust ducts and adjust fans and dampers to achieve specified air volumes.
5. Test and adjust fresh air intake and return air dampers and louvers to conditions scheduled or required.
6. Test and record static pressure on entering and leaving side of each supply fan, exhaust fan filter, coil and balancing dampers and other components of system.
7. Test and adjust supply air diffusers, grilles, and return air registers to Specification requirements and as shown on Drawings. Adjust supply diffuser pattern blades for proper air distribution in each room or space.
8. Measure temperature in each space and concurrent outside temperature



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B. Testing and Adjusting Water Systems:

1. Flow of water through water coils shall be adjusted by adjusting valves until rated pressure drop across each coil is obtained and water flow verified by venturi readings. On those with three-way valves, rated pressure drop shall first be adjusted through coils in each of several **systems** and the temperature differential between inlet and outlet shall be determined to be in accordance with its rating. Bypass valves shall *then* be adjusted on each coil until an equal pressure drop between supply and return connections is obtained with the three-way valves set to bypass all coils in each of the several systems.

C. Testing and Adjusting Automatic Controls:

1. Test automatic controls, controlled devices, interlocks, and safety devices associated with HVAC system for proper operation and sequence during heating, cooling, intermediate and smoke removal modes of operation. Adjust automatic controls to deliver required quantities of air at temperatures specified or scheduled on Plans and to maintain proper conditions in each room of building.
2. Report deficiencies or malfunctions to Authority.

D. Marking of settings:

1. Before final acceptance of report is made, TAB firm shall furnish Authority the Following data:
  - a. Summary of main supply, return and exhaust duct pitot tube traverses and fan settings indicating minimum value required to achieve specified air volumes.
  - b. A tabulated record of temperature in all spaces on each separately controlled zone, together with outside temperature at time of measurement.
  - c. A list of measured air quantities at each outlet corresponding to temperature tabulation specified above.
  - d. Air quantities at each return and exhaust air-handling devices.
  - e. Supply pressure readings entering and leaving each supply fan, exhaust fan, filter, balancing dampers and other components of system. These readings shall be related to fan curves in terms of CFM handled.
  - f. Motor current readings per phase at each equipment motor. Voltage at time of reading shall be listed.
  - g. Water pressure reading at gauge connections. Pressure readings at coils and pumps shall be related to coil and pump curves in terms of **GPM** flow through metering stations at each coil if applicable.

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- h. Water temperature readings entering and leaving each coil and heat exchanger under maximum load conditions in each case.
2. The final report shall certify test methods and instrumentation used, final velocity ready obtained, air quantities at each outlet supply, return, exhaust, temperatures, pressure drops, **RPM** of equipment, amperage of motors, air balancing problems encountered, recommendations and uncompleted punch list items. Test results shall be recorded on standard forms, included at end of this Section.
3. A summary of actual operating conditions shall be included on each system outlining normal and/or ventilation cycles of operation. The intent of final report will provide a reference of actual operating conditions for Authority's operating personnel.
4. "Certificate of Substantial Completion" will not be signed by the NJEDA unless an acceptable TAB report has **been** provided and accepted by NJEDA.
5. Insure that all systems are balanced at the proper time in the opposite season.

### **PART 2 - PRODUCTS** (Not applicable)

### **PART 3 - EXECUTION** (Not Applicable)

**END OF SECTION 01411**

## **SECTION 01520 - STORAGE AND PROTECTION**

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### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Provisions established within the General and Supplementary Conditions of the Contract, Specifications, and Drawings are collectively applicable to this Section.

#### **1.2 REQUIREMENTS INCLUDED**

- A. Storage, General.
- B. Enclosed Storage.
- C. Exterior Storage.
- D. Maintenance Storage.

#### **1.3 RELATED REQUIREMENTS**

- A. Section 01010 - Summary of Work.
- B. Section 01500 - Construction Facilities and Temporary Controls: Storage facilities. Protection of installed work.
- C. Section 01810 - Project Record Documents.

### **PART 2 - PRODUCTS (Not Applicable)**

### **PART 3 - EXECUTION**

#### **3.1 STORAGE, GENERAL**

- A. Store products, immediately on delivery, in accordance with manufacturer's instructions, with seals and labels intact. Protect until installed.
- B. Arrange storage in a manner to provide access for maintenance of stored items and for inspection.

#### **3.2 ENCLOSED STORAGE**

- A. Store products, subject to damage by the elements, in substantial weather tight enclosures.
- B. Maintain temperature and humidity within ranges stated in manufacturer's instructions
- C. Provide humidity control and ventilation for sensitive products as required by manufacturer's instructions.
- D. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.

#### **3.3 EXTERIOR STORAGE**

- A. Provide substantial platforms, blocking, or skids, to support fabricated products above ground; slope to provide drainage. Protect products from soiling and staining.
- B. For products subject to discoloration or deterioration from exposure to elements, cover with impervious sheet material. Provide ventilation to avoid condensation.

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- C. Store granular materials on clean, solid surfaces such as pavement, or on rigid sheet materials, to prevent mixing with foreign matter.
- D. Provide surface drainage to prevent erosion and ponding of water.
- E. Prevent mixing of refuse or chemically injurious materials or liquids.

### **3.4 MAINTENANCE OF STORAGE**

- A. Periodically inspect stored products on a scheduled basis.
- B. Verify that storage facilities comply with manufacturer's product storage requirements.
- C. Verify that manufacturer's required environmental conditions are maintained continually.
- D. Verify that surfaces of products exposed to the elements are not adversely affected, that any weathering of finishes is acceptable under requirements of Contract Documents.

### **3.5 MAINTENANCE OF EQUIPMENT STORAGE**

- A. For mechanical and electrical equipment in long-term storage, provide manufacturer's service package.
- B. Service equipment on a regularly scheduled basis, maintaining a log of services; submit as a Record Document.

**END OF SECTION 01520**

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## **SECTION 01600 - PROE AND SUBSTITUTIONS**

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### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawing and General Provisions of Contract, including but not limited to, General and supplementary Conditions and other Division 1, Specification Sections, apply to work of this Section.

#### **1.2 QUALITY ASSURANCE**

- A. Source Limitations: To the fullest extent possible, provide products of the same generic kind, from a single source, for each unit of work.
- B. Approval: All substitutions must be approved by Design Consultant and the Project Management Firm.

#### **1.3 SUBMITTALS**

- A. Product Listing Submittal

- 1). General: Prepare a product-listing schedule in a form acceptable to the Design Consultant and the Project Management Firm. Show names of the principal products required for the Work, by generic name. Show proprietary product names and the name of the manufacturer for each item listed that is to be purchased and incorporated into the Work.
  - 2). Form: Prepare the product-listing schedule with information on each item tabulated under the following scheduled column headings:
    - a. Generic name as used in Contract Documents.
    - b. Proprietary name, model number and similar product designation
    - c. Manufacturer's and supplier's name and city/state addresses.
    - d. Related unit-of-work Specification Section number.
    - e. Manufacturer's Data.
    - f. Performance and test data.
    - g. Reference Standard.
  - 3). Submittal: Within ~~fifteen~~ (15) days after date of Contract, submit two (2) copies to Design Consultant and one copy to Project Management Firm of complete list of all products and materials which are proposed for installation.
- B. Design Consultant's Action: The Design Consultant will respond to the Contractor in writing within two (2) ~~week~~ of receipt of the product-listing schedule. No response by the Design Consultant within the two (2) week time period constitutes no objection to the listed products or manufacturers, but does not constitute a waiver of the requirement that products comply with the requirement of the Contract Documents. All substitutions must be acceptable to the Project Management Firm. The Design Consultant's response will include the following:

## **SECTION 01600 - PRODUCTS AND SUBSTITUTIONS**

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- 1). The Design Consultant's and Project Management Firm's listing of unacceptable product selections, if any, containing an explanation of reasons for this action.
- 2). A request for additional data necessary for the review and possible acceptance of the products and manufacturer's listed.

### **C. Substitution Request Submittal**

- 1). Requests for Substitutions: Submit five (5) copies of each request for substitution. In each request identify the product or fabrication or installation method to be replaced by the substitution; include related Specification Section and Drawing numbers, and complete documentation for substitutions. Include the following information, as appropriate, with each request.
  - a. Provide complete product data, drawings and descriptions of products, and fabrication and installation procedures.
  - b. Provide samples where applicable or requests.
  - c. Provide complete cost information, including a proposal of the net change, if any in the Contract Price.
  - d. Provide certification by the Contractor to the effect that, in the Contractor's opinion, after thorough evaluation, the proposed substitution will result in work that in every significant respect is equal-to or better than the work required by the Contract Documents, and that it will perform adequately in the application indicated.
  - e. Include in this certification, the Contractor's waiver of rights to additional payment or time, which may subsequently be necessary because of the failure of the substitution to perform adequately.
- D. Substitution Request Form: Submit requests for substitution in the form acceptable to the Authority.
- E. Design Consultant's Action: Within one (1) week of receipt of Contractor's request for substitution, the Design Consultant will request additional information or request additional information or documentation as may be needed for evaluation of the request. Within *two* (2) weeks of receipt of the request, or within one (1) week of receipt of the requested additional information or documentation, which ever is later, the Design Consultant will notify the Contractor of either the acceptance or rejection of the proposed substitution.

Acceptance will be in the form of a Change Order. Rejection will include a statement giving reason for rejection.

**1.4 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. General: Deliver, store, and handle products in accordance with manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss including theft. Control delivery schedule to minimize long-term storage at the site and to prevent overcrowding of construction spaces. In particular coordinate delivery and storage times for items known or recognized to be flammable, hazardous, easily damaged or sensitive to deterioration, theft and other source of loss.

**PART 2 - PRODUCTS****2.1 GENERAL PRODUCTS COMPLIANCE**

- A. Procedures for Selecting Products: The Contractor's options in selecting products are limited by requirements of the Contract Documents and governing regulations. They are not controlled by industry traditions or procedures experienced by the Contractor on previous construction projects. Required procedures include but are not limited to the following for the various indicated methods of specifying.
- B. Two or More Product Names: Where two or more products or manufacturers are named, provide one of the products named, at the Contractor's option. Exclude products that do not offer to provide an unnamed product, unless the Specification indicates possible consideration of other products. Advise the Design Consultant or Project Management Firm before proceeding where none of the named products comply with Specification requirements, or are feasible for use.
- 1). Where products or manufacturers are specified by name, accompanied by the term "or-equal" or similar language, comply with the Contract Document provisions concerning "substitutions" to obtain approval from the Design Consultant for the use of an unnamed product.
- C. Compliance with Standards, Codes and Regulations: Where the Specifications require only compliance with an imposed standard, code or regulations, the Contractor has the option of selecting a product that complies with Specification requirements, including the standards, codes and regulations.

**2.2 SUBSTITUTIONS**

- A. Conditions: The Contractor's request for a substitution will be received and considered when extensive revisions to the Contract Documents are not required, when the proposed changes are in keeping with the general intent of the Contract Documents, when the requests are timely, fully documented and properly submitted, and when one or more of the following conditions is satisfied, all as judged by the Design Consultant or Project Management Firm; otherwise the requests will be returned without action except to record non-compliance with these requirements.

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- 1). The Design Consultant will consider a request for substitution where the request is directly related to an “or equal” clause or similar language in the Contract Documents.

- B. Work-Related Submittals: The Contractor’s submittal of and the Design Consultant’s acceptance ~~of~~ shop drawings, product data or samples which relate to work not complying with requirements of the Contract Documents, does not constitute an acceptance or valid request for a substitution, nor approval thereof.

### **2.3 GENERAL PRODUCT REQUIREMENTS**

- A. General: Provide products that comply with the requirements of the Contract Documents and that are undamaged and, unless otherwise indicated, **unused** at the time of installation. Provide products that are complete with all other devices and details needed for a complete installation and **for** the intended use and effect.

### **PART 3 - EXECUTION (Not Applicable)**

**END OF SECTION 01600**



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## SECTION 01700 - CONTRACT CLOSE-OUT

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including but not limited to. General and Supplementary Conditions and other Division 1, Specification Sections, apply to work of this Section.
- B. Section 01810 - Project Record Documents
- C. Section 01820 - Operation and Maintenance Data.
- D. Section 01850 - Warranties and Bonds.

#### 1.2 DESCRIPTION OF REQUIREMENTS

- A. Contract Close-out is the term used to describe certain collective Contract requirements, indicating completion of the Work that are to be fulfilled near the end of the Contract Time in preparation for final acceptance and occupancy of the Work by the Authority, as well as final payment to the Contractor and normal termination of the Contract.
  - 1). Time of close-out is directly related to "Substantial Completion;" therefore, the time of close-out may be either a single time period for the entire Work or a series of time periods for individual elements of the Work that have been certified as Substantially Complete at different dates. This time variation, if any, shall be applicable to the other provisions of this Section.
- B. Close-Out submittal include, but are not necessary limited to:
  - 1). Project Record Documents described in Section 01810.
  - 2). Certification of Substantial Completion.
  - 3). Copy of Final Change Order, if applicable.
  - 4). Copy of Final Application for Payment.
  - 5). Consent of Surety to Final Payment.
  - 6). Certificate of Occupancy of Building or Certificate of Acceptance.
  - 7). Contractor's Affidavit of Release of Liens.
  - 8). Contractor's Affidavit of Payment of debts and claims.
  - 9). Contractor's Confirmation of General Guarantee.

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- 10). Transmittal Listing Keys: Contractor shall prepare an itemized key list in complete detail ending in a statement that the keys were turned over, the Contractor's signature, a line stating that the keys were received and the receiver's signature. Copies of this list should be retained by the Contractor and receiver and a copy sent to the Design Consultant, Project Management Firm and NJEDA. Keys should be identified with tags corresponding to the approved room number designation.
  - 11). Letter from Design Consultant and Project Management Firm that all Punch List Items have been completed to his satisfaction and recommendation regarding liquidated damages, if applicable.
  - 12). Operating, Instruction and Maintenance Manuals for Equipment (Mechanical, Electrical, Plumbing, etc.). All stamped by Consultant or Engineer as in accordance with Specifications.
- B. Final Adjustment of Accounts
- 1). Submit final statement reflecting adjustments to Contract Price indicating:
    - a. Original Contract Price.
    - b. Previous Change Orders.
    - c. Changes under allowances.
    - d. Deductions for uncorrected work
    - e. Deductions for liquidated damages.
    - f. Deductions for reinspection fees.
    - g. Other adjustments to Contract Price.
    - h. Total Contract Price as adjusted.
    - i. Previous payments.
    - j. Sum remaining due.
  - 2). If so required, the Project Management Firm will prepare a final Change Order showing adjustments to the Contract Price which were not made previously by Change Orders.
- C. Instruction: Instruct the Authority's personnel in proper operation and maintenance of systems, equipment, and similar items which were provided as part of the Work.

## **PART 2 - PRODUCTS (Not Applicable)**

## **SECTION 01700 - CONTRACT CLOSE-OUT**

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### **PART 3 - EXECUTION**

#### **3.1 SUBSTANTIAL COMPLETION**

- A. General: Complete the following before requesting the Design Consultant's inspection for Certification of Substantial Completion, either for the entire Work or for portions of the Work. List known exceptions in the request.
- 1). Prepare and submit a contractor's Punchlist of work remaining to be completed
  - 2). After receipt of the punchlist, Design Consultant will inspect to determine status of completion.
  - 3). Should the Design Consultant or Project Management Firm determine that the Work is not Substantially Complete, the Project Management Firm promptly will so notify the Contractor, in writing, giving the **reasons** therefore.
  - 4). The Contractor shall remedy the deficiencies and notify the Design Consultant and Project Management Firm when ready for reinspection.
  - 5). The Design Consultant and Project Management Firm will reinspect *the* work. When the Design Consultant and Project Management Firm concur that the **Work** is Substantially Complete, the Design Consultant will prepare a "Certificate of Substantial Completion" on AIA form G704, accompanied by the Contractor's list of items to be completed or corrected, as verified by Design Consultant and Project Management Firm. The Design Consultant will submit the Certificate to the Authority and to the Contractor for their written acceptance of responsibilities assigned to them in the Certificate.

#### **3.2 CERTIFICATE OF FINAL ACCEPTANCE & COMPLETION**

- A. General: Complete the following before requesting the Design Consultant's and Project Management Firm's final inspection for Design Consultant's and Project Management Firm's final inspection for Certification of Final Acceptance and Completion, and Final Payment as required by the General Conditions. List known exceptions, if any, in the request.
- 1). Certify that:
    - a. Work has been inspected for compliance with the Contract Documents.
    - b. Work has been completed in accordance with the Contract Documents.
    - c. Equipment and systems have been tested, as required, and are operational.
    - d. Work is completed and ready for final inspection.
  - 2). The Design Consultant and Project Management Firm will conduct an inspection to verify status of completion.

## **SECTION 01700 - CONTRACT CLOSE-OUT**

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- 3). Should the Design Consultant or Project Management Firm determine that the Work is incomplete or defective:
  - a. The Project Management Firm promptly will notify the Contractor, in writing, listing the incomplete or defective work.
  - b. The Contractor shall remedy the deficiencies promptly, and notify the Project Management Firm when ready for reinspection.
  - c. When the Design Consultant and Project Management Firm determine that the Work is acceptable under the Contract Documents, and that all required submittals have been made, the Project Management Firm will request the Contractor to submit a final application for payment.

### **3.3 APPLICATION FOR FINAL PAYMENT**

- A. Submit Application for Final Payment in accordance with provisions of Conditions of the Contract.

### **3.4 FINAL CLEANING**

- A. General: Special cleaning requirements for specific units of work are included in the appropriate Section of Divisions 2 through 16. General cleaning during the regular progress of the Work is required by the General Conditions.
  - 1). Use experienced workmen, or professional cleaners for final cleaning.
  - 2). At completion of construction and just prior to acceptance or occupancy, conduct a final inspection of exposed interior and exterior surfaces.
  - 3). Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from interior and exterior surfaces.
  - 4). Repair, patch and touch-up marred surfaces to match adjacent finishes.
  - 5). Broom clean paved surfaces. Rake clean other operated during construction.
  - 6). Clean ducts, blowers, and coils if air conditioning units were operated during construction.
  - 7). Sweep and buff resilient floors and base.
  - 8). Dust all walls, metal, wood and similar finished materials.
  - 9). Clean all cabinet and casework.
  - 10). Dust and wash all plumbing and electrical fixtures. Remove stickers from plumbing fixtures.
  - 11). Wash and buff or polish all non-resilient materials.
  - 12). Vacuum carpet floors.
  - 13). Vacuum all floor areas scheduled to receive floor finish by others.
  - 14). Wash and polish all glass, inside and out.
  - 15). Replace broken or scratched glass with new glass.

**END OF SECTION - 01700**

## **SECTION 01710 - FINAL CLEANING**

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### **PART 1- GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

#### **1.2 SECTION INCLUDES**

- A. Final cleaning **of** project and related site **work**.

#### **1.3 RELATED SECTIONS**

- A. General Conditions: Clean-up.
- B. Section 01500 - Temporary Facilities and Controls: Cleaning **during** construction.
- C. Section 01701 -Contract Closeout Procedures.
- D. Individual Specification Sections: Specific cleaning **for** product or work.

#### **1.4 DESCRIPTION**

- A. Execute cleaning prior to inspection **for** Substantial Completion of **Work**

### **PART 2 - PRODUCTS**

#### **2.1 CLEANING MATERIALS**

- A. Use material which will not create hazards to health or property, and which will not damage surfaces.
- B. Use only materials and methods recommended by manufacturer of material being cleaned.

### **PART 3 - EXECUTION**

#### **3.1 CLEANING**

- A. In addition to removal of debris and cleaning specified in other Sections, **clean** interior and exterior exposed-to-view surfaces.
- B. Remove temporary protection and labels not required to remain.
- C. Clean finishes free of dust, stains, films, and other foreign substances
- D. Clean transparent and **glossy materials** to a polished condition; remove foreign substances.
- E. Vacuum clean carpeted and similar soft surfaces.

## **SECTION 01710 - FINAL CLEANING**

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- F. Clean, damp mop, wax and polish resilient and hard-surface **floor** as specified.
- G. Clean surfaces of equipment; remove excess lubrication.
- H. Clean plumbing fixtures, and food service equipment and replace disposable filters when units have been operated without filters during construction.
- I. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers, and coils when units have been operated without filters.
- J. Clean light fixtures and lamps.
- K. Maintain cleaning until Final Acceptance and Completion.
- L. Remove waste, foreign matter, and debris from roofs gutters, areaways, and drainage systems.
- M. Remove waste, debris, and **surplus** materials from site. Clean **grounds**; remove stains, spills, and foreign substances from paved areas and sweep clean. Rake clean other exterior surfaces.

**END OF SECTION 01710**

## **SECTION 01810 - PROJECT RECORD DOCUMENTS**

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### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A.** General Provision of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to Work of this Section.

#### **1.2 DESCRIPTION**

- A.** Work includes maintaining at job site, in clean, legible condition, copies of the following:
  - 1). Contract Drawings.
  - 2). Project Manuals.
  - 3). Addenda.
  - 4).** Reviewed shop drawings.
  - 5). Change Orders and Field Orders.
  - 6). Other modification to Contract.
  - 7). Testing Laboratory Reports.
- B.** Store documents in temporary field office, apart from all other documents used for construction. Provide all necessary files and racks for storage of above Documents to maintain them in a clean, dry, legible condition. Under no circumstances are Record Documents to be used for construction purposes.
- C.** Make Documents available for inspection by Design Consultant and Project Management Firm at all times.
- D.** Refer to Divisions IS and 16 for mechanical / electrical Record Documents.

#### **1.3 RECORDING**

- A.** Label each document "Project Record Documents," in stamped or printed letters, on front cover or other conspicuous place.
- B.** Legibly mark to record actual construction as follows:

##### Construction Drawings:

- 1). Location of underground utilities and appurtenances referenced to permanent surface improvements.
- 2). Locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
- 3). Field changes of dimension and detail.
- 4).** Changes made by Change Orders or Field Orders.
- 5). Details not on original Contract Drawings.

- C. Mark-up Procedure: During progress of the Work, maintain a white-print set (blue-line or black-line) of Contract Drawings and shop drawings, with mark-up of actual installations which vary substantially from the Work as originally shown. Record Documents shall be examined by the Project Management Firm and Design Consultant monthly as a procedural aspect of Applications for Payment. Mark whatever drawing is most capable of showing actual physical condition, fully and accurately. Where shop drawings are marked-up, mark cross-reference on Contract Drawings at corresponding location. Mark with erasable colored pencil, using separate colors where feasible to distinguish between changes for different categories of Work at same general location. Mark-up important additional information which was either shown schematically or omitted from original Drawings. Give particular attention to information on Work concealed, which would be difficult to identify or measure and record at a later date. Note Alternate numbers, Change Order numbers and similar identification. Require each person preparing mark-up to initial and date mark-up and indicate name of firm. Contractor shall pay reproduction costs for one (1) set of marked up blue line prints to Design Consultant. Design Consultant shall transfer all information from "blue-line" prints to CADD software, providing the District with one (1) blue line set and one (1) on disk.
- D. Project Manuals and Addenda:
- 1). Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
  - 2). Changes made by Change Order or Field Order.
  - 3). Other matters not originally specified.
  - 4). All final submitted material shall be placed in ringed binder(s), separated into categories, and indexed all non-applicable information will be deleted (e.g. marked out).
  - 5). Shop Drawings, Change Orders, Field Orders and other modifications: Maintain as Record Document.

#### 1.4 SUBMITTALS

- A. Prior to Final Payment, submit to Project Management Firm.

#### PART 2 - PRODUCTS (Not Applicable)

#### PART 3 - EXECUTION (Not Applicable)

#### END OF SECTION 01810



## SECTION 01820 - OPERATING AND MAINTENANCE DATA

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### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Compile product data and related information appropriate for Client School District's maintenance and operation of products furnished under the Contract.
  - 1). Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent Sections of Specifications.
- B. Instruct Client School District's personnel in the maintenance of products and in the operation of equipment and systems.
- C. Related requirements specified in other Sections:
  - 1). Submittals: Section 01300.
  - 2). Project Close-Out: Section 01700.
  - 3). Project Record Documents: Section 01810.

#### 1.2 FORM OF SUBMITTALS

- A. Prepare data in the form of an instructional manual for use by Authority's personnel.
- B. Format:
  - 1). Size: 8-1/2 x 11 inch.
  - 2). Paper: 20 pound, minimum, white for typed pages
  - 3). Text: Manufacturer's printed data, or neatly typewritten
  - 4). Drawings:
    - a. Provide reinforced punched binder tab, bind in with text.
    - b. Fold larger drawings to the size of the text pages.
  - 5). Provide fly-leaf for each separate product, or on each piece of operating equipment.
    - a. Provide **typed** description of product, and major component parts of equipment.
    - b. Provide indexed tabs.
  - 6). Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE DATA."
    - a. List:
      - (1). Title of Project.
      - (2). Name of Contractor.

## **SECTION 01820 - OPERATING AND MAINTENANCE DATA**

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### **C. Binders:**

- 1). Commercial quality three-ring binders with durable and cleanable plastic covers.
- 2). Maximum ring size : 3 inches.
- 3). When multiple binders are used, correlate the data into related consistent groupings. Mark binders in sequence.

### **1.3 CONTENT OF MANUAL**

#### **A. Table of Contents:**

- 1). Neatly typewritten Table of Contents for each volume. Base Table of Contents of Operating and Maintenance Data on Table of Contents of these Specifications.

#### **B. Product Data:**

- 1). Include only those sheets which are pertinent to the specific product.
- 2). Annotate each sheet to:
  - a. Clearly identify the specified product or part installed.
  - b. Clearly identify the data applicable to the installation.
  - c. Delete references to inapplicable information.
- 3). List, with each product, the name, address and telephone number of:
  - a. Subcontractor, including name of responsible principal, address and telephone number.
  - b. Maintenance contractor, as appropriate.
  - c. Identify the area of responsibility of each.
  - d. Local source of supply for parts and replacement.

#### **C. Drawings:**

- 1). Supplement product data with drawings as necessary to clearly illustrate:
  - a. Relations of component parts of equipment and systems.
  - b. Control and flow diagrams.
- 2). Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
- 3). Do not use Project Record Documents as maintenance drawings.